

Applicant : Donald F. Hooper
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Intel Corporation

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1-22. (Cancelled).

23. (Currently amended) A network router comprising:

an input switch;

an output switch;

a controller, the controller comprising a plurality of look-up engines, the look-up engines receiving look-up requests in a round robin fashion; and

a memory for storing data for access by a longest prefix match program, the program comprising:

a data structure stored in the memory, the data structure including information used by the longest prefix match program and including:

at least one [[a]] large first table at a root, the at least one first table comprising entries indexed according to a first portion of an Internet Protocol (IP) address span and maintaining links to the root branching to a first set of nodes containing small a first set of trie tables corresponding to less significant portions of the IP address span, the entries of the at least one first table not including links to route entries, each table of the first set of trie table tables configured to be indexed according to addressed by a span of Internet protocol (IP) address bits in the corresponding IP address span of that trie table to locate an indexed trie entry, the indexed trie entry including a corresponding route pointer and a corresponding trie pointer; and

at least one second table at the root, the at least one second root table comprising entries indexed according to a second portion of the IP address span, each entry of the at least one second root table including a corresponding route pointer and a corresponding trie pointer, at

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least some of the entries having corresponding trie pointers pointing to entries in a second set of trie tables at a second set of nodes:

computer instructions that, when executed, cause the look-up engines to traverse in parallel the ~~trie tables~~ first table at the root and its linked first set of trie tables, and the second table at the root and its linked second set of trie tables.

24. (Currently amended) The router of claim 23 wherein the ~~small each~~ trie tables table of the first set of trie tables and the second set of trie tables comprises:

- prefix match fields for each indexed entry;
- a population count of pointers; and
- hidden prefix entries.

25. (Previously presented) The router of claim 24 wherein the each of the hidden prefix entries hold shorter prefix entry pointers.

26. (Currently amended) The router of claim 24 wherein the ~~small~~ trie tables are stored in a static random access memory (SRAM) and used for route lookups, route adds and route deletes.

27. (Previously presented) The router of claim 24 wherein the indexed trie entry is a 32-bit longword.

28. (Currently amended) A network router comprising:

- a plurality of input ports linked to an input switch;
- an output switch linked to a plurality of output ports;
- a controller, the controller comprising a plurality of look-up engines, the look-up engines receiving look-up requests in a round robin fashion; and

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a memory, the memory including a process for searching a database for a prefix representing a destination address, the process comprising:

reading a data structure stored in the memory, the data structure comprising:

at least one a large first table at a root, the at least one first table comprising entries indexed according to a first portion of an Internet Protocol (IP) address span and maintaining links to the root branching to two a first set of nodes containing small a first set of trie tables corresponding to less significant portions of the IP address span, the entries of the at least one first table not including links to route entries, each table of the first set of trie table tables configured to be indexed according to addressed by a span of Internet-protocol (IP) address bits in the corresponding IP address span of that trie table to locate an indexed trie entry, the indexed trie entry including a corresponding route pointer and a corresponding trie pointer;

at least one second table at the root, the at least one second root table comprising entries indexed according to a second portion of the IP address span, each entry of the at least one second table including a corresponding route pointer and a corresponding trie pointer, at least some of the entries having corresponding trie pointers pointing to entries in a second set of trie tables at a second set of nodes;

traversing in parallel the two trie tables of trees first root table and its linked first set of trie tables and the second root table and its linked second set of trie tables to find a match of a trie entry to the prefix.

29. (Currently amended) The router of claim 28 wherein the each route pointer represents the a corresponding destination address and the each trie pointer points to a next small a different trie table.

30. (Currently amended) The router of claim 28 wherein the small each trie tables table comprise comprises:

prefix match fields for indexed table entries;

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a population count of pointers; and
hidden prefix entries that hold shorter prefix route entry pointers.

31. (Previously presented) The router of claim 28 further comprising reporting a non-match if the prefix does not match an entry.

32. (Currently amended) The router of claim 28 wherein ~~[[a]]~~ the first large root table is a single 64k entry table that is indexed by bits 31:16 of an internet protocol (IP) address.

33. (Currently amended) The router of claim 28 wherein ~~[[a]]~~ the second large root table is a single 256 entry table that is indexed by bits 31:24 of an internet protocol (IP) address.

34. (Currently amended) The router of claim 32 wherein ~~the small~~ each of the trie tables of the first set of trie tables ~~are~~ is dynamically allocated and ~~comprise~~ comprises:
a tree with each node representing 4 bits of addresses covering an extension of 1-4 bits of a prefix entry from a previous tree.

35. (Currently amended) The router of claim 33 wherein ~~the small tables~~ each of the trie tables of the second set of trie tables ~~is~~ are dynamically allocated and ~~comprise~~ comprises:
a tree with each node representing 4 bits of addresses covering an extension of 1-4 bits of a prefix entry from a previous tree.

36. (New) The network router of claim 23, further comprising computer instructions that when executed cause the controller to:
add a new entry to a trie table selected from at least one of: the first set of trie tables, and the second set of trie tables; and
delete an old entry from a trie table selected from at least one of: the first set of trie tables, and the second set of trie tables.

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37. (New) The network router of claim 36, wherein the computer instructions that cause the controller to delete the old entry from the selected trie table include instructions that, when executed, cause the controller to:

- remove the old entry;
- decrement a population counter associated with the selected trie table;
- identify another entry having the next longest prefix; and
- insert the identifies next longest prefix into the trie.